

DELAWARE CONSTRUCTION SPECIFICATION

SACKED CONCRETE RIPRAP CS 53

1. SCOPE

The work shall consist of furnishing all materials, labor, and equipment and performing all operations required for the construction of sacked concrete riprap required in the works.

2. MATERIALS

Portland cement shall conform to the requirements of Material Specification 202 for the specified type.

Aggregates shall be sand or sand-gravel mixtures and shall be clean and free from roots, vegetable matter and other deleterious substances. Unless otherwise specified, aggregates may be pit-run materials approved by the NRCS Technician.

Water shall be clean and free from injurious amounts of oil, acid, alkali, organic matter or other deleterious substances.

Sacks shall be made of at least 10 ounce burlap (or approved equivalent material) and shall each have a capacity of at least 1.5 cubic feet. The length of each sack shall be approximately twice the width. Sound reclaimed sacks may be used.

3. CONCRETE MIX AND MIXING

The cement content of the mix shall be not less than five (5) sacks per cubic yard of concrete. The water content of the mix shall be not greater than eight (8) gallons per bag of cement. The grading of combined aggregates shall be such as will produce a mixture with a slump of from three inches to five inches.

Mixers and agitators shall be operated within the limits of the manufacturer's guaranteed capacity and speed of rotation. Maximum capacities, expressed as percentages of the gross volume of the drum or container, shall not exceed 63.25 percent for truck mixing, 70 percent for shrink mixing, and 80 percent for agitating.

When concrete is mixed at a central plant the time of mixing after all cement and aggregates are in the mixer drum shall be not less than one minute for mixers having a capacity of one cubic yard or less. For mixers of larger capacities, the minimum time shall be increased fifteen seconds for each cubic yard or fraction thereof of additional capacity. If dual-drum mixers are used, the time consumed in transferring the batch from one drum to the other shall not be included as part of the mixing time. The batch shall be so charged into the mixer that some water will enter in advance of cement and aggregate, and all mixing water shall be introduced into the drum before one-fourth of the mixing time has elapsed.

When concrete is mixed in a truck mixer loaded to its maximum capacity, the number of revolutions of the drum or blades at mixing speed shall be not less than 70 nor more than 100. If the batch is at least $\frac{1}{2}$ cubic yard less than maximum capacity, the number of revolutions at mixing speed may be reduced to not less than 50. Mixing in excess of 100 revolutions shall be at the speed designated by the manufacturer of the equipment as agitating speed. The mixing operation shall begin within 30 minutes after the cement has been added to the aggregates. When mixing is begun during or immediately after charging, a portion of the mixing water not in excess of that required to produce the minimum acceptable slump shall be added ahead of, or with, the other ingredients.

When concrete is partially mixed at a central plant and the mixing is completed in a truck mixer (shrink mix), the mixing time in the central plant mixer shall be the minimum required to intermingle the ingredients and shall be not less than 30 seconds. The mixing shall be completed in a truck mixer and the number of revolutions of the drum or blades at mixing speed shall be not less than 50 nor more than 100.

When an agitator, or a truck mixer used as an agitator, transports concrete that has been completely mixed in a stationary mixer, mixing during transportation shall be at the speed designated by the manufacturer of the equipment as agitating speed.

When ready-mixed concrete is furnished, the Contractor shall furnish to the NRCS Technician a statement of delivery ticket showing the time of loading, the revolution counter reading at the time of batching, and the quantities of materials used for each load of concrete.

4. **PLACING**

Approximately one cubic foot of concrete shall be placed in each sack. The top of the sack shall be folded or tied with wire to retain the concrete when the bag is placed in position.

Immediately after being filled with concrete, each sack shall be placed and lightly trampled to cause it to conform with the earth face or bedding and with adjacent sacks in place. The sacks shall be placed in such a manner that joints in succeeding courses are staggered. All dirt and debris shall be removed from the top of each completed course before the next course is laid thereon. Stretchers shall be placed so that the folded or tied ends will not be adjacent. Headers shall be placed with the folds toward the earth face. Not more than four vertical courses of sacks shall be placed in any tier until initial set has taken place in the first course of any such tier.

When the delay in placement between successive courses is sufficient to allow the completed course to set before the sacks in the next course are placed, the surface of the hardened course shall be thoroughly moistened prior to placement of the next course.

5. **CURING**

Sacked concrete riprap shall be cured by covering with a blanket of wet earth or by sprinkling with a fine spray of water every two (2) hours during the daytime for a period of four (4) days.

6. **WEEP HOLES**

Weep holes shall be provided at locations shown on the drawings and shall be formed as shown on the drawings or by inserting 2" x 2" stakes, between adjoining sacks. As soon as the sacked concrete has received its initial set, the stakes shall be removed.